"Silver Bullets"

by Colonel Vollney B. Corn, Jr., and Captain Richard A. Lacquemont

At 0230 (Saudi Arabia time) on 17 January 1991, the phone rang in the 1st Armored Division Artillery (Div Arty) Commander's tent. The duty officer reported, "Sir, Tomahawks are away; the [air] war has started." In a matter of minutes, several runners left the Div Arty tactical operations center (TOC) and raced throughout the assembly area to pass the word. Soldiers went from deep sleep to sharp awareness that their world had just changed drastically.

At 0800 on 28 February, just over 43 days later, the 1st Armored Division stopped. With lead units just inside western Kuwait and the main body still in Iraq, the same soldiers listened as the tracked vehicles halted, firing ceased and a calm descended on the battlefield. During the next few hours, many soldiers finally resumed the comfortable rest so sharply interrupted a few weeks earlier, satisfied they had succeeded.

During ground operations against the Iraqi Army between 24 and 28 February, the 1st Armored Div Arty played a key role. We began with a well-developed plan accompanied by rehearsals before the attack, conducted a fluid movement-to-contact and a series of hasty attacks and ended by destroying the Medinah Division of the Republic Guards Forces Command (RGFC).

In the course of an 87-hour, 218-mile attack, the 1st Armored Division Force Artillery delivered 1,213 rockets and more than 9,500 rounds of cannon fire against formations of the Iraqi Army, to include the vaunted RGFC. To themselves, their maneuver counterparts and the world, the soldiers of the 1st Armored Division Artillery had, once again, proven the awesome power of the FA.

As we look back on our experiences during Operation Desert Storm, we find several critical aspects of our force structure and equipment need improving or reassessing. These "Silver Bullets," as we call them, should be addressed with an eye toward taking the FA into the 21st century with the ability to perform our mission as the "King of Battle" as well as we have in the past. The recommendations in this article are based on our experiences in the war with the Iraqi Army and present the changes that will most benefit us in the future.

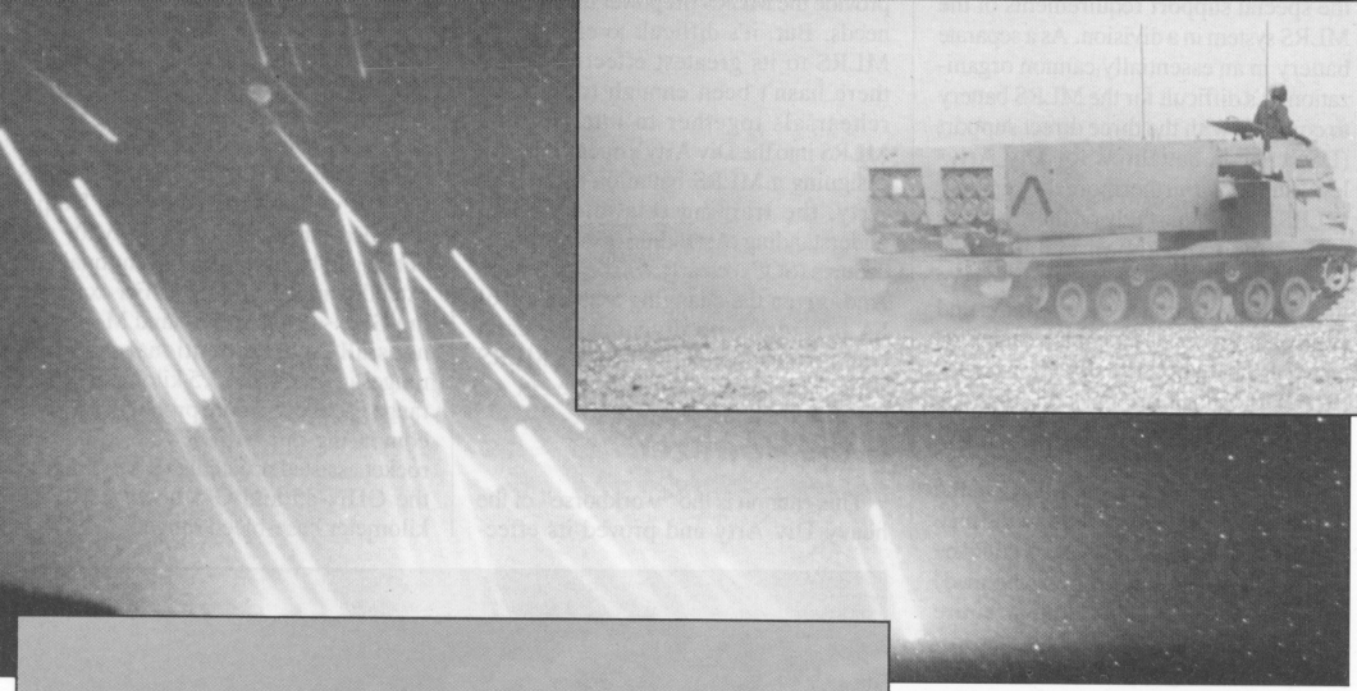
MLRS

In its first combat test, the multiple launch rocket system (MLRS) performed superlatively. The system's accuracy and lethality quickly established itself as a critical part of our force artillery firepower. In particular, we relied on the MLRS as our primary counterfire weapon, and in this role, we silenced all enemy artillery that fired at us. But three improvements will make this system even more valuable to the FA. We need to harden the system to reduce maintenance down time, increase the range of the weapon to 50 kilometers and increase the force structure of all heavy Div Artys to include an MLRS battalion (as opposed to the current MLRS battery).

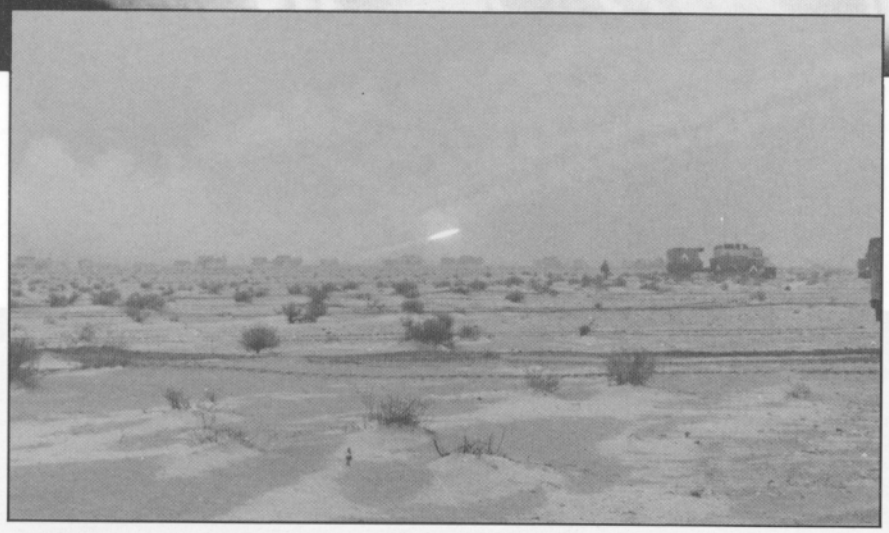
Harden the system. During training before the ground war, we spent considerable time and effort keeping the MLRS launchers operational. The complexity of the system was evident in the myriad of electronic and firing mechanism faults that needed constant attention.

In live-fire training and then in the MLRS raid our launchers fired before the ground war, the launchers went down because of firing damage to various components. Limit switches, line replacement units (LRUs) and resolver couplings frequently had maintenance problems. To the credit of our maintenance soldiers, most problems were fixed quickly. Although it may be a sign of the relative youth of the system, we had to spend too much time on maintenance, especially with problems caused by live firing.

Using information generated from the extensive live firing of the system during the war, we can focus on those parts with



During Desert Storm, MLRS launchers light up the sky with rockets that streak toward Saddam Hussein's forces.



MLRS Firing in Desert Storm. The US needs to increase the MLRS' range to 50 kilometers to counter the range of existing and developing international systems.

the most maintenance trouble. With some improvements, we can harden the system to significantly reduce the number of firing-related faults.

Increase MLRS Range. In spite of the poor performance of the Iraqi Artillery in the war, it's significant to note they had four cannon systems (GHN45, G-5, GCT and M-46) and two tactical multiple rocket launch (MRL) systems (BM-21 and ASTROS) that could outrange MLRS. In the hands of a better trained and more intelligent foe, these systems could have made it extremely difficult for us in a counterartillery battle.

In this war, Allied air supremacy made up for our lack of conventional artillery range. The Iraqis also lacked a good target acquisition system, which undercut their ability to use the range they had. Coupled with our outstanding intelligence and target acquisition capability, our FA system far outclassed the Iraqis'.

However, the weak link in the fire support system is our weapons' limited range. To stay ahead of our potential adversaries, we must ensure the ranges of our weapons support the stand-off capabilities we rely on for success. Considering the ranges of the Iraqi systems and the improvements likely in international weapons over time, the Army needs to increase the MLRS range to 50 kilometers.

Maybe, like the Brazilian ASTROS system, the answer is to create another size rocket that falls somewhere between the MLRS rocket and the Army tactical missile system (Army TACMS) missile. But, whereas the Army TACMS provides for operational depth, lending itself to theater-level command and control, we need to improve the MLRS' ability to influence the division fight, in particular the deep and counterartillery battles.

Div Arty MLRS Battalion. As currently structured, heavy Div Artys have one battery of MLRS. These nine launchers, though valuable, provide little flexibility or depth to the Div Arty's organization. Furthermore, the nature of a separate battery causes some command and control problems.

In the war against Iraq, we were fortunate to have an MLRS battalion (minus one of its organic batteries) assigned to our Div Arty. This allowed the MLRS battalion headquarters to control our battery, eliminated the command and control problems inherent in having a separate battery and gave us additional firepower and flexibility. This structure should be the standard for all heavy Div Artys.

From a command and control standpoint, the MLRS battalion headquarters is a more appropriate agency to deal with

the special support requirements of the MLRS system in a division. As a separate battery in an essentially cannon organization, it's difficult for the MLRS battery to compete with the three direct support (DS) cannon battalions for Div Arty-level support. Furthermore the separate MLRS battery must rely on the division's main support battalion maintenance while maintenance is an organic part of the MLRS battalion. For command and control of fires, it's also much easier for an MLRS battalion fire direction center (FDC) to control fire missions than for the Div Arty Headquarters to try to control one battery.

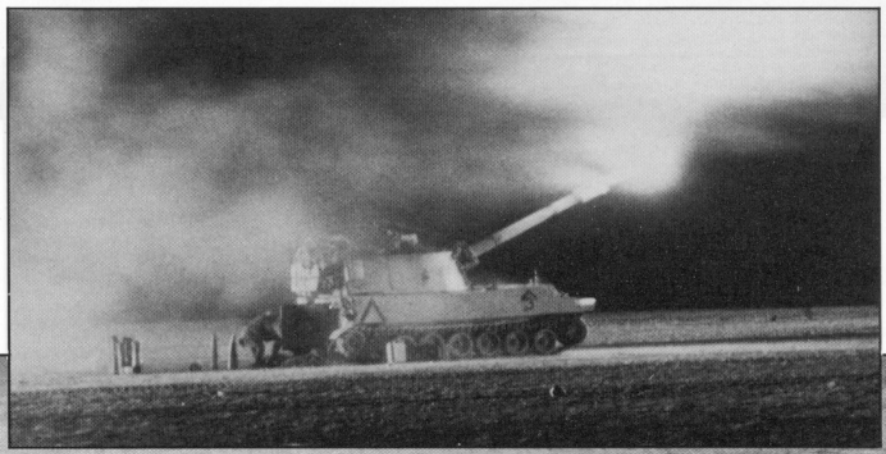
Given the importance of MLRS to the division fight, it's easy to see how the nine launchers of the separate battery could be overworked (if not simply overwhelmed) by the demands of supporting an entire division. Our experience showed the importance of being able to rotate fire missions with a greater number of launchers to allow MLRS firing units to rest and conduct maintenance stand-downs to support continuous operations.

With FA brigades reinforcing divisions in contact, some may argue that they'll provide the MLRS firepower the division needs. But, it's difficult to employ the MLRS to its greatest effectiveness if there hasn't been enough training or rehearsals together to integrate the MLRS into the Div Arty's operations. By assigning a MLRS battalion to the Div Arty, the training relationship and understanding of standing operating procedures (SOPs) clearly will be improved. And, given the changing association of FA brigades with divisions, we can't count on having the FA brigade MLRS battalion available when we need it.

M109 Howitzer

This cannon is the "workhorse" of the heavy Div Arty and proved its effectiveness in every battle with the Iraqi Army. As with the MLRS, increasing the M109's range will greatly enhance the system's value and effectiveness.

Like the MLRS, the M109 howitzer was easily outranged by several Iraqi artillery systems. Although the MLRS mainly was outranged by the Iraqi's extended-range munitions, the M109 was outranged by both the conventional and extended-range munitions. For example, the GHN-45, G-5, GCT and M-46 cannons all have conventional munition ranges in excess of 23.5 kilometers. The range gap is even more pronounced when comparing our M109's 23.5-kilometer rocket assisted projectile (RAP) range to the GHN-45 and G-5 howitzers' 39.6 kilometer base-bleed range.



Top: An M109 howitzer fires into the night during Desert Storm. Bottom: The M109, the workhorse of the heavy Div Arty, needs a range of up to 50 kilometers with RAP to be most effective against potential international adversaries.

To redress this imbalance, future munition and howitzer programs should strive to achieve a conventional munitions range of about 40 kilometers with extended munitions ranging out to 50 kilometers. As with the MLRS range increase, this should give us the artillery standoff firepower we need.

Target Acquisition

Firefinder Radars. In general, the Q-36 and Q-37 Firefinder radars performed well during the war. The Q37, in particular, had no significant faults and was an extremely reliable source of enemy targeting information. It provided many more enemy artillery acquisitions during our counterfire battle than the Q-36 did.

The problem with the Q-36 was not that it didn't pick up artillery or mortar fire, but that it picked up too many other targets, thus confusing the situation. Many Q-36 acquisitions simply didn't make sense. We speculate the radar is too sensitive and thus tends to pick up secondary explosion fragments and other trajectory producing objects, showing these as acquisitions. In a more developed situation where we can establish and control radar zones better, these false targets may not be as troublesome; however, because of our rapid offensive operations, we had to carefully examine all the radar acquisitions to assess their logic and priority of engagement.

With the Q-36s, we often received acquisitions from behind our front line and many from the areas where maneuver direct-fire battles were taking place. We usually could weed out the erratic acquisitions and focus on the real targets. But, when using Q-36 acquisitions we had to be more careful before we fired upon them. For the most part, we could rely on the Q-37s to confirm any questionable Q-36 acquisition.

To remedy this situation, the trajectory assessment routine of the Q-36 software should be re-examined to improve the radar's ability to discriminate amongst different trajectories. By introducing a better set of filtering assessments, the number of extraneous or false acquisitions generated by the Q-36 should decrease.

Remotely Piloted Vehicles. One of the most effective target acquisition means used in the theater was the British remotely piloted vehicle (RPV). With the death of the Aquila RPV program in the US Army, we were without a similar capability during this war.

CW4 Kenneth D. Brooks

Q36 and Q36 radar crews pose in the Saudi desert. Both radars performed well, with the Q37 the most reliable source of targeting information.

The British RPVs were extremely valuable to the British forces, providing outstanding real-time intelligence—not just for artillery targeting, but also for their maneuver forces. We need to get on with developing a similar capability for the US Army.

For the artillery in particular, an RPV would be the perfect partner for the Q-37 and Q-36 radars. Whereas the radars support the counterfire battle, an RPV would significantly improve our ability to acquire enemy artillery before it fires, thereby supporting the counterartillery battle.

Fire Support Team Vehicle (FIST-V). It's clear from this war the FIST-V is inadequate. The chassis is based on the old M113 family of vehicles and can't keep up with the current M1 Abrams tank and M2/3 Bradley fighting vehicle fleet. The sights of the FIST-V are inferior to both the Bradleys' and the Abrams', making it difficult for the FIST to identify targets in a timely manner. At 3,000 meters, many of our FISTs had not even seen the enemy vehicles, but the Bradley and Abrams crews were already engaged in direct-fire fights. Furthermore, as we were on the offense, the constant fire and maneuver of the tanks and infantry fighting vehicles created a fluid situation, hampering the FIST-V crew's ability to elevate the hammerhead (holding the ground/vehicular laser locator device, or G/VLLD) and use it.

We need a fire support vehicle that can move as fast as the maneuver units it supports, that has sights at least as good as those on the direct-fire systems and that can perform its mission on the move. The FIST-V doesn't meet these standards.

Cargo and Transport Vehicles

Although not a very glamorous part of the Army inventory, our basic cargo and transportation vehicles are the "back bone" of moving and sustaining our fighting force. Unfortunately, our overall fleet of vehicles suffers from some critical deficiencies.

General-Purpose Trucks. In our force structure, every cargo vehicle has a specified haul mission. At the same time, we have many requirements that don't have dedicated vehicles to support them.

During this war, we were forced to take many vehicles "out of hide" to support unresourced haul requirements. For example, we had to take some heavy expanded-mobility tactical trucks (HEMTTs) designated for ammunition carrying (MLRS and cannon) to haul the meals-ready-to-eat (MREs) and bottled water required to sustain our operations. In addition, because the load designations of our trucks don't account for items such as soldiers' TA-50 and tentage or mail pickup, we had to use vehicles designated for other purposes.

The solution to this problem is to give each battalion a few general-purpose cargo trucks to support these previously unresourced missions.

Support Vehicle Mobility. In a heavy division, we have tracked vehicles for

mobility off road. The wheeled vehicles that support our tracked vehicles must be able to operate on the same terrain. The wheeled vehicles that performed the best in the often difficult desert terrain were the high-mobility multipurpose wheeled vehicle (HMMWV) and the HEMTT. Other wheeled vehicles, such as the commercial utility cargo vehicle (CUCV) and 2 1/2-ton and 5-ton trucks, had a lot more trouble negotiating the terrain, especially pulling a trailer.

We should change our force structure so all trucks that operate forward of a division's rear are either from the HMMWV or HEMTT family of trucks. In addition to improving the cross-country mobility of the division's combat and combat support units, this would greatly simplify maintenance by having a more standardized fleet of vehicles.

Improvements for All Vehicles. Every vehicle in the US Army, tracked or wheeled, needs three critical items of equipment: an air-ground friendly identification device similar to the Air Force's identification friend or foe (IFF) system, an independent navigational device and a radio. These three items would go a long way toward eliminating some of the most critical problems we face on the modern battlefield.

The main function of the IFF device is to prevent fratricide. If every vehicle had a passive identification beacon, our compatibly outfitted weapon systems could query a target to determine whether or not it's friendly. Even on a confused battlefield, Air Force aircraft, tanks, attack helicopters and other highly lethal weapon systems could quickly determine if a vehicle is ours or the enemy's before attacking it.

Our experience in the virtually featureless desert proved the value of navigational devices such as the global positioning system (GPS) and long-range aid to navigation (LORAN) devices. Although most valuable in places such as the desert, such devices are important in any terrain in the world.

Freed from relying completely on error-prone map and compass work, these devices increased our ability to navigate from one location to another immeasurably. The most obvious navigational applications are for maneuver forces. But the critical masses of support vehicles that shuttled back and forth to sustain the combat formations were the most likely to get lost or disoriented on the fluid battlefield.

With LORAN and GPS, it's feasible to have these or similar devices in every vehicle. Small and easy to use, they easily solve navigational problems that have been the bane of armies since time immemorial.

In addition, every vehicle should have a radio. For most vehicles, a short-range radio (one to two miles) is enough for convoy and movement control. For key command and control vehicles, the radios would be the tactical ones needed for longer range communications. And approximately one in every five support vehicles should have a tactical radio for communications in support missions. All radios should be able to function on the same frequencies for internal communications and be secure.

We should change our force structure so every truck that operates forward of a division's rear is either a HMMWV or HEMTT.

Logistics

Organic Support for FA Brigades. One of the most critical deficiencies we encountered was that FA brigades don't have organic support. Each FA brigade should have its own support battalion to plug into either a corps or division's support system. This would allow the FA brigade much greater flexibility in changing its support relationship in accordance with the scheme of maneuver.

As it was, we spent a lot of time and energy trying to figure out how to provide enough support to the FA brigades associated with our Div Arty. With their own support battalions, the FA brigades wouldn't be at the mercy of the constantly changing support relationships they encounter.

Munitions. Throughout the war, dual-purpose improved conventional munitions (DPICM) for the howitzers and MLRS and Army TACMS all proved enormously effective against the Iraqi Army. Unfortunately, the dud rate of the submunitions, while low, left many unexploded bomblets that later caused some injuries and death to friendly forces. After the cease fire, these dud submunitions (along with Air Force cluster bomb submunitions) caused the most casualties among our forces.

We must improve the submunition to either drastically reduce the dud rate or render the submunitions harmless a few hours after they're fired. We could include a timed self-destruct mechanism on each submunition—as we do with family of scatterable mines (FASCAM) submunitions. Or, we could create a deliberate weak link in the firing mechanism that, after a few hours outside of the projectile's protective casing, deteriorates and render the submunitions ineffective.

Improve M109/FAASV Fire Extinguishers. After the war but before returning to Saudi Arabia, we had two FA ammunition supply vehicles (FAASVs) catch fire and burn. In both instances, the crews immediately evacuated the vehicles, and the fire spread to the am-

munition storage area totally destroying the vehicles. As a result, it was impossible to determine what caused the fires and why the automatic fire extinguishers failed to contain the fire. It appears one fire started in the engine compartment and one in a blower motor in the ammunition compartment.

In both fires, the halogen fire extinguishers activated correctly, but the fires re-ignited after the extinguishers finished. This is probably because briefly starving the engine compartment of oxygen (as the halogen extinguishers do) doesn't eliminate the cause of the fire (most likely a hot engine component in contact with spilled fuel). Therefore, the fires can re-ignite and, ultimately, spread from the engine compartment to the rest of the vehicle.

A combined carbon dioxide and halogen fire extinguisher would work better. It could cut off the oxygen (thus stopping electrical fires) and cool heat sources (the likely source of fuel fires).

Conclusion

Though the Desert Storm ground war lasted only 100 hours, the US moved more forces, farther, in a shorter period of time, bringing more firepower on the enemy than in any campaign in US history. We must capture the data of that campaign and extract the lessons learned.

This article is the 1st Armored Div Arty's contribution to those efforts.

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Using MLRS rockets, the 18th FA Brigade sends Saddam Hussein a message: "Have a bad day!"